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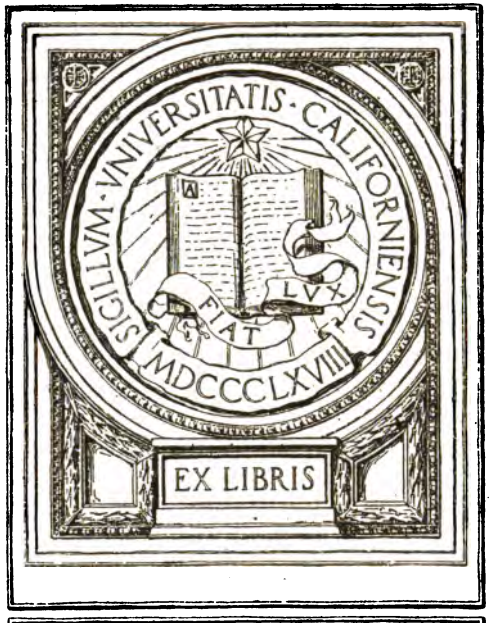
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DESCRIPTION

OF

THE PREDICTION SCALE
THE SET-FORWARD RULER
THE MINE-PREDICTION RULER
and THE PREDICTER

(*FOUR PLATES*)

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DESCRIPTION OF THE PREDICTION SCALE, THE SET-FORWARD RULER, THE MINE-PREDICTION RULER, AND THE PREDICTER.

DESCRIPTION OF THE PREDICTION SCALE.

(Plate I.)

All prediction scales manufactured by Frankford Arsenal and numbered serially from 1 to 42, both inclusive, are of bronze throughout, 8.8 inches long, and 1 inch wide. The bottom surface is plane, finished smooth, and left of natural color; the upper surface consists of a central strip 0.3 inch wide running the entire length of the scale and parallel to the bottom surface. On either side of this central strip are two beveled strips extending the entire length of the scale, and each 0.35 inch wide. These beveled strips are graduated from the center outward in both directions, with 0 in the center of the scale and 1000 at either end. Each even hundred has its value engraved on the scale. The spaces between even hundreds are divided into ten parts, as shown on Plate I. The scale is 300 yards equals 1 inch. All engraved figures have the bottom of the figure inward, which permits the scale to be read from either side without trouble. The upper surface is sand-blasted, and the graduations and figures are filled in with black. For convenience in handling the scale, two small bronze knobs projecting from the central strip are screwed to the scale.

All prediction scales of serial numbers higher than 42 are of white celluloid on upper surface, with metal rib extending along back of scale for entire length, as is shown in Plate I. The dimensions and general description for the bronze scale as given above apply also to this scale, as the only difference between the bronze and reinforced celluloid scales is the use of white celluloid with black graduations for the upper surface of scales numbered serially above 42.

DESCRIPTION OF THE SET-FORWARD RULER.

(Plate II.)

The set-forward ruler is a white celluloid slide rule of ordinary type. It consists of two parts, the body and the slide.

The body is a piece of white celluloid 12 inches long, 1.5 inches wide, and 0.25 inch thick. The upper surface of the body is divided into two equal parts, each extending the entire length of the ruler,

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by an undercut slot 0.12 inch deep, which forms the runway for the slide. Placing the set-forward ruler face up, with the names of the various scales on the right, as shown in the assembled view, the upper scale is designated "Yards travel during time of flight plus 1 minute." This scale is calculated for all values from 100 to 1,300 yards, least reading 10 yards. Every 50-yard graduation is engraved with its proper value. The lower scale is designated "Yards per minute travel" and is calculated for all values from 50 to 700 yards, least reading 10 yards. The 50, 60, 70, 80, and 100 yard graduations have their values engraved on the ruler. Abve 100 yards every 50-yard graduation is engraved with its proper value.

The slide is of white celluloid 4.75 inches long, and designed to be moved in the undercut runway in the body. By moving the slide so that the arrow mark comes opposite any travel on the "Yards per minute travel" scale on the body, the correct value of "Yards travel during time of flight plus 1 minute" may at once be read on the upper scale of the body opposite the value on the "Time of flight in seconds" scale of the slide for any particular time of flight. Thus, if the yards per minute travel of the target is 420, the arrow should be set opposite 420 on the lower scale of the body. If the time of flight of the projectile should be 20 seconds, the graduation on the upper body scale opposite 20 seconds on the slide scale would read 560 yards travel during time of flight plus 1 minute; and similarly for other values which might be assumed. All surfaces are finished white, with graduation, lettering, and figures in balck.

Set-forward rulers beginning with serial No. 56 are built up of celluloid-faced mahogany on a German-silver support. The graduations and method of operation are the same as in the case of rulers of serial Nos. 1 to 55, inclusive.

DESCRIPTION OF THE MINE-PREDICTION RULER.

(Plate III.)

The mine-prediction ruler consists of a slide and a body. The body is made of mahogany guides faced with celluloid strips and secured to a German-silver support. The ruler is used as a part of the equipment of a primary station of a mine command.

The logarithmic scales represent the distance to the mine from the target in yards, the travel of the target in yards during 15 seconds, and the time at which the mine should be fired. The prediction scale on the beveled edge is graduated 150, 100, or 50 yards to the inch to agree with the scale to which the submarine plotting board for a given mine command is constructed.

The ruler is used as an ordinary slide rule. For example, if the distance of target from mine is 90 yards and the target is traveling

40 yards in 15 seconds, set 40 on "yard in 15 seconds" scale opposite 90 on "yards to mine" scale; the time required for the target to reach the mine, 33¾ seconds, will be found on the "fire at time" scale opposite the arrow on the "yards in 15 seconds" scale.

DESCRIPTION OF THE PREDICTER.

(Plate IV.)

The predicter consists of 10 pointers so pivoted to connecting straps that the distance between the pointers may be varied within small limits while the ratio of distance between pointers remains fixed. Eight of the pointers are equally spaced on the connecting strips and the spacing represents travel in 10 seconds. The other 2 pointers are spaced to represent travel in 60 seconds. The predicter has been manufactured for limited use for mortar batteries and mine commands.

In using, the predicter should be held at an angle of approximately 45° with the plane of the board. The pointer pivoted to the two long connecting strips should be used as the 0 point and placed over the plotted point from which it is desired to predict.

In the use of the predicter care should be taken to prevent bending or deformation of the points of the pointer. To test the accuracy of the predicter, lay out in a straight line 8 points ¼ inch to $\frac{5}{16}$ inch distance and 2 points at a distance of six times the interval between pairs of the 8 points on either side of the 8 lines. Place the predicter over the points and if necessary carefully bend the points to suit.

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